

Inside this issue:

Upcoming Workshops	2
Workshops Around the State	2
Science of Climate	3
Robotics Training	3
Current Missions News Summary	3
Workshop and Science Quotes of the Month	4
.ERC Contact information	4

MMS, MARS, and ERC Partnership



"The Magnetospheric Multiscale (MMS) mission is a Solar Terrestrial Probes mission comprising four identically instrumented spacecraft that will use Earth's magnetosphere as a laboratory to study the microphysics of three fundamental plasma processes: magnetic reconnection, energetic particle acceleration, and turbulence. These processes occur in all astrophysical plasma systems but can be studied in situ only in our solar system and most efficiently only in Earth's

magnetosphere, where they control the dynamics of the geospace environment and play an important role in the processes known as "space weather." (MMS Website) Troy Cline, who is from WV and graduated from WVU, is the NASA lead officer of Education and Public Outreach for MMS.

The NASA IV&V Educator Resource Center has partnered with MMS and MARS (Mountaineer Area Robotics) to:

1. Develop 2 LEGO models of the MMS spacecraft. This effort is being led by the MARS group with the work being completed by high school and college students. Oversight is by Dr. Earl Scime and Phil Tucker of WVU.
2. Develop Space Math activities which will become part of the Space Math site <http://spacemath.gsfc.nasa.gov/> led by [Dr. Sten Odenwald](#). The WV lead for this part is Dr. Marjorie Darrah of WVU.
3. Develop a Teacher Guide comprised of background information on the spacecraft, the LEGO model directions, Space Math activities, etc. The lead for this part is Dr. Darrah and Todd Ensign.
4. Develop a poster of the spacecraft along with activities and links to the LEGO models on the back. This

part is being led by Todd Ensign.

*Upper left photo: Developing LEGO prototype by MARS
Below photo: Artist rendition of the four MMS probes*



GEEK WEEK - Mercer County NASA Missions

Mercer County offers teachers a wide variety of professional development opportunities before the beginning of the school year. The ERC has presented sessions for the past two years that has allowed the county teachers to be certified on multiple topics. This year Mercer teachers were offered Model Rocketry, Robotic Explorations with LEGO WeDo's, GPS, and NASA, Remote Sensing and Carnegie

Dinosaurs. Forty-six county teachers became certified to check out one or more of the ERC's activity kits to use in their classrooms.

If you are interested in having the ERC offer professional development classes for in-service days before school starts or on professional development days during the school year contact the ERC at erc@ivv.nasa.gov or call Pam Casto at 367-8436.

The list of current missions at the NASA website has 90+ listings! People often fail to realize that many NASA missions are very Earth based. The first words of NASA's mission statement are "To understand and protect our home planet." In order to carry out that mission, NASA has Earth based projects of its own and forms partnerships with other agencies and countries such as the National Oceanic and At-

mospheric Administration, the U.S. Geological Survey, the American Meteorological Society, Canada, France and Japan to name a few.

This month a sample of some of NASA's earth focused missions with brief descriptions are provided on page three. More information about each can be obtained from the NASA website: nasa.gov

Workshop Offerings Around the State

In past newsletters, the “Upcoming ERC Workshops” only reflected what was being offered on site at the Educator Resource Center. The ERC typically offers over 120 workshops per year—most at locations other than the ERC. Many of these other locations had room in their workshop for more educators and graciously allowed others to attend.

To reflect that availability, we will list workshop offerings from around the state that may have room for more attendees. We will not be listing scheduled professional development by specific counties, schools, or organizations that are for their employees only.

For example, in September, Harrison County Parks and Recreation is offering two workshops for their staff and volunteers, and has offered others in the area the opportunity to fill in any leftover available slots in the workshop. Those workshops are now listed on the

ERC list of upcoming workshops and you may register as usual at our website. If for any reason the workshop is too full, we will contact you the week before the workshop.

This is particularly beneficial to groups who may have trouble getting twelve participants together to have a workshop away from the ERC. By opening it up to others within their area it becomes easier to get the numbers necessary to have us travel to you while allowing us to make wise use of our travel budget.

Remember, all ERC workshops are free to your organization and those that are kit based include the certification to check out the necessary equipment to implement the activities in the classroom or in an informal educational setting.

Upcoming ERC Workshops and Events

Sept. 6 Viewing the Universe with Telescopes ERC 5-8 PM

Sept. 10 NASA’s Space Place (Webinar) 11 AM-12 Noon

Sept. 13 Robotics Exploration/ LEGO WeDo’s Harrison Co. Parks and Recreation/4-H Center 4-8 PM

Sept. 20 GPS Harrison Co. Parks and Recreation/4-H Center 4-7 PM

Sept. 22 STARLAB and SpacePlace ERC 5-8 PM

Sept. 23 FSU Science and Engineering Day

Sept. 28 Physics of Flight/Fly By Math ERC 5-8 PM

Oct. 11 Basic Rocketry 5-8 PM

Oct. 15 NASA Engineering Design Challenge (Webinar) 11 AM

Oct. 22 Model Rocketry ERC 10-4 PM

Oct. 27 Robotics Exploration/ WeDo’s ERC 4-8 PM

Nov. 3-5 WV Science Teachers Conference at Flatwoods

Below photo: Determining cloud cover as a percentage of the whole sky



PBL: The Science of Climate



science of climate.

Weather and climate are the study of temperature, humidity, precipitation, atmospheric pressure, and wind. Climate is the average condition of the weather in a region over a period of years. These concepts were explored in depth.

Materials from The JASON Project and NASA’s GLOBE Program, Global Learning and Observations to Benefit the Environment,

were used throughout the workshop.

Teachers were provided with all the necessary equipment to do an in-depth problem based learning project in their classroom in the coming year. They will create presentations for next year’s WV Science Teachers Association meeting.

Upper left photo: Using their new instruments to obtain weather data

Glenville State College was the scene for a Climate Institute collaboration between Glenville State College, Fairmont State University, The JASON Project, the GLOBE Program, and the NASA IV&V Educator Resource Center. The week long summer institute trained educators to use project-based learning, hands-on inquiry-based labs, real-life data collection, and technology to engage students and teach the



The Educator Resource Center, MARS (Mountaineer Area Robotics), and WVU Extension 4-H services joined together to enable the formation of ten new First LEGO League robotics teams in West Virginia. These students and their coaches met at various locations around the state to learn programming skills, to acquaint themselves with how FLL competitions are structured,

4-H, MARS, NASA Robotics

and to hear tips from peers that have had extensive experience with building, programming, and operating robots in competitions. Check out the FFL site for more information: www.firstlegoleague.org

Left photo: planning a way through an obstacle course

Center photo: mentor Phil Tucker, MARS

Upper right photo: coaching session

Lower right photo: creating controlled turns



A Sampling of NASA Earth Focused Missions

Aqua, Latin for water, is a NASA Earth Science satellite mission named for the large amount of information that the mission will be collecting about the Earth's water cycle.

AIM (Aeronomy of Ice in the Mesosphere) is a two-year mission to study Polar Mesospheric Clouds, the Earth's highest clouds, which form an icy membrane 50 miles above the surface at the edge of space.

Aquarius launched on June 10, 2011, is a mission to map the ocean's salinity from space.

ARCTAS (Arctic Research of the Composition of the Troposphere from Aircraft and Satellites) has a name that says it all.

Aura, is a mission dedicated to the health of the Earth's atmosphere.

CALIPSO (Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation) is providing information to scientists and researchers from

over 35 countries. The data are helping answer questions about Earth's warming and cooling patterns as they are affected by clouds and aerosols, which are tiny particles suspended in the air.

CloudSat has radar that is 1,000 times more sensitive than typical weather radar and can detect clouds and distinguish between cloud particles and precipitation.

Earth Observing 1 has validated advanced land imaging and unique spacecraft technologies.

GOES (Geostationary Operational Environmental Satellites) provide a constant vigil for the atmospheric "triggers for severe weather conditions such as tornadoes and hurricanes.

ICESat (Ice Cover and Land Elevation mission) will provide multi-year elevation data regarding ice sheet mass balance as well as cloud property information, especially for

stratospheric clouds common over polar areas.

Jason -1 is the first follow-on to the highly successful TOPEX/Poseidon mission that measured ocean surface topography. Jason 2 is the joint NASA-French satellite will help scientists better monitor and understand rises in global sea level, study the world's ocean circulation and its links to Earth's climate.

Landsat Program is a series of Earth-observing satellite missions jointly managed by NASA and the U.S. Geological Survey.

NOAA-N is the latest in a series of polar-orbiting satellites, that will collect information to improve weather prediction and climate research across the globe.

Operation Ice Bridge, a six-year NASA field campaign, is the largest airborne survey of Earth's polar ice ever flown. It will yield a three-dimensional view of Arctic and Antarctic ice sheets, ice shelves and sea ice.

Terra is a multi-national, multi-disciplinary partnership between the U.S., Canada and Japan that is helping us better understand and protect our home planet.

The ERC Staff

Todd Ensign ...Program Manager

todd.ensign@ivv.nasa.gov 304-367-8438

Pam Casto...Education Specialist

pam.casto@ivv.nasa.gov 304-367-8436

Josh Revels...ERC Intern / IV&V Librarian

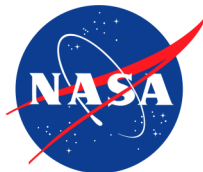
josh.revels@ivv.nasa.gov 304-367-8251

Amy Phillips...Graduate Assistant for Student Programs

amy.phillips@ivv.nasa.gov 304-367-8379

ERC Website: <http://erc.ivv.nasa.gov>

The NASA Independent Verification and Validation Program Educator Resource Center's goal is to serve teachers, informal educators, and pre-service teachers to enable them to reach their goals. Through a grant with Fairmont State University, the NASA IV&V Program ERC provides materials, equipment for loan, and professional development workshops for informal and formal educators both at the facility and around the state of West Virginia that reflect NASA's current research and technology.



Workshop Comment of the Month:

WOW! What a great way to spend a Saturday. My team drove from the southern part of the state and this was one of the top ten workshops I've attended in my 25 years of teaching. The ERC did an outstanding job. This will not only affect my students but my 4H'ers as well. Thank you so very much for this opportunity to bring this avenue of technology of robotics to our students. All who attended with me (student and parents) and thrilled at what we get to do! Again - THANK YOU!

Science Quote of the Month:

"Though my soul may set in darkness, it will rise in perfect light . . . I have loved the stars too fondly to be fearful of the night." Sarah Williams, English poet of the 1800's, in the poem "The Old Astronomer to his Pupil"

Links to Student Competitions

First Lego League Robotics:

<http://www.firstlegoleague.org/>

Real World Design Challenge:

<http://www.realworlddesignchallenge.org/>

Team America Rocketry Challenge:

<http://rocketcontest.org/>

Green Aviation Contests:

<http://aero.larc.nasa.gov/competitions.htm>

Where in WV is the ERC?

August Workshops in Red

August Equipment Loans in Blue

To schedule a workshop:

Contact the ERC by calling 304-367-8436 or emailing:

pamela.casto@ivv.nasa.gov

To schedule equipment for loan:

First, check the equipment loan calendar on the ERC website to see if the equipment is available for the dates desired. Then choose your dates (up to a two week loan period) and email Josh Revels who will schedule the loan.

josh.revels@ivv.nasa.gov

